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THE PREVENTION OF RHEUMATIC FEVER BY CONTROL OF HEMOLYTIC STREPTOCOCCUS INFECTION

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Rheumatic fever is a disease which produces disability not only because of the acute inflammatory process but also as a result of the deformities of the heart valves which so often follow. Investigation over the last 20 years has contributed much to an understanding of its etiology and pathogenesis.

As a result of these studies it has become apparent that infection by hemolytic streptococci is in some way related to the development of the rheumatic state. The supporting evidence has been based on indirect observations and may be summarized as follows: (1) Rheumatic fever has been a sequel to known hemolytic streptococcus infections, particularly of the respiratory tract. (2) Epidemics of rheumatic fever always follow outbreaks of scarlet fever or streptococcus sore throat. (3) Recurrences frequently appear when infection by hemolytic streptococci occurs in persons who have had previous attacks of rheumatic fever. (4) Immunologic investigations have demonstrated that high titers of various antistreptococcal antibodies are regularly demonstrable in the serum of persons with acute rheumatic fever.

Additional information obtained during study of epidemics of hemolytic streptococcus infection in the armed forces during World War II demonstrated that rheumatic fever did indeed occur only following infection by Group A hemolytic streptococci. Reports of these studies described in detail the sequence of events following infection by the

A year ago the American Heart Association, in cooperation with the Public Health Service, launched an extensive educational program aimed at prevention of rheumatic fever through control of hemolytic streptococcus infection, to which Dr. Rantz gives renewed emphasis in this article.

Educational kits, which include a film, "Stop Rheumatic Fever"; a discussion guide for the film; two leaflets on rheumatic fever; a booklet entitled "Stop Rheumatic Fever"; and a statement for professional use, were made available to California and can be borrowed from the Bureau of Health Education, State Department of Public Health. A number of local heart associations also have kits to loan.

hemolytic streptococcus and pointed out the great frequency and complex nature of the nonsuppurative disorders which are such common sequelae.

The usual sequence of events begins with a hemolytic streptococcus respiratory infection which may be accompanied by sore throat, exudative tonsillitis and pharyngitis, tender anterior cervical adenitis and, occasionally, by a skin rash. Often this illness is much less typical clinically and may be exceedingly mild or even inapparent.

The acute respiratory phase of the illness subsides and is followed by a latent or quiescent period in which

the patient may seem to be entirely well, although detailed study will often reveal evidence of an active process. After about two weeks there is the variably explosive outbreak of a new disease, characterized by arthritis, fever and carditis in various combinations. These disorders are not the result of dissemination and focalization in the affected tissues of streptococci from the nasopharynx, nor is there anatomic evidence of true supuration. This phase of hemolytic streptococcus disease has become known as the period of late nonsuppurative complications. Details as to fundamental mechanisms involved in the pathogenesis of these disorders have been lacking but the present point of view may be summarized.

It seems quite certain that Group A hemolytic streptococci are etiologically responsible for rheumatic fever. Multiple reinfection by different strains or types of these organisms is probably essential for development of the disease.

Incomplete, but strongly suggestive, evidence indicates that an inappropriate immunologic process, leading to sensitization to some fraction or product of Group A streptococci, is responsible for the tissue damage. There is no hint as to what fraction or product of Group A streptococci is directly involved in sensitization or the nature of the abnormal processes by which aberrant immunologic reactions produce tissue damage. The recent discovery that adrenal steroids will modify the clinical course of rheumatic fever has failed to cast addi-

tional light on the fundamental mechanisms of the disease.

Epidemiology

The epidemiology of rheumatic fever is that of infections with hemolytic streptococci. Disease caused by these organisms is spread from one person to another. Large numbers of healthy carriers exist in the population and are especially numerous among children. Immunologic study indicates that nearly all of these carriers have had overlooked or inapparent streptococcus respiratory infection; it is believed that most streptococcus infection is of this type. This is to be expected, since many of these illnesses are mild and do not come under the care of a physician or may not even be associated with clinical symptoms. Difficulties of diagnosis in the absence of bacteriologic control also make recognition of the etiologic agent unlikely, particularly in young children, even though a physician is in attendance. Recognized cases of streptococcus respiratory disease are possible sources of infection but are certainly much less important than unsuspected carriers.

This huge reservoir of potential transmitters suggests that streptococcus respiratory disease is extremely common, and this is indeed the case. Immunologic investigation revealed that, in almost 80 percent of San Francisco children 5-15 years of age, there was definite evidence of past contact with hemolytic streptococci capable of stimulating the production of antistreptolysin O. Not only does hemolytic streptococcus infection occur at least once in most children, but here is considerable evidence to indicate that reinfection is common. In a group of children studied by the author, recognizable reinfection by these organisms occurred in about 50 percent each year.

First attacks of rheumatic fever occur most frequently between the ages of five and nine. This is undoubtedly related to the greater exposure of this age group to streptococci, since young and middle-aged adults have the same susceptibility to the disease, after hemolytic streptococcus infection as do children. At all susceptible ages, approximately 3 percent of such respiratory infections

are complicated by frank rheumatic fever.

The greatest risk to the rheumatic patient is contact with young children. This is a fact of considerable importance when planning chemoprophylactic regimens.

There are striking geographic variations in the incidence of rheumatic fever in the United States. The disease occurs most frequently in a rather narrow belt running north and south on each side of the Rocky Mountains, in broader areas around the Great Lakes and in the northeastern states. It is comparatively uncommon in the South and Southwest. Experience in the armed forces during World War II indicates that hemolytic streptococcus infection is endemic in these same areas. No satisfactory explanation of these facts has been proposed. It is generally not profitable to recommend that rheumatic patients move to low incidence areas since only incomplete protection against streptococcus infection and recurrence of rheumatic fever is afforded. Meticulous care and use of prophylactic regimens are usually essential in any section of the country.

Rheumatic fever also is common in sections of large cities in which the economic level is low and standards of living are poor. Overcrowding of dwelling appears to be an important factor in creating this situation. It is more than probable that such environments foster the spread of hemolytic streptococcus infection.

There is considerable evidence which suggests that rheumatic fever occurs more frequently in certain families than in others. Whether this is due to a genetically transmitted predisposition to the disease has not been determined. It is possible that families showing high incidence have simply perpetuated an environment favorable to the hemolytic streptococcus.

The Organism

The hemolytic streptococci may be segregated into lettered groups by means of specific serological reactions. Those responsible for respiratory infection in human beings are nearly all members of Group A. Typing of strains of this group by agglutination or precipitation techniques is possible, and valuable information has been

obtained by application of these methods.

Group A streptococci form an extraordinary variety of extracellular substances, some of which are toxic in experimental animals. Only one, the familiar erythrogenic or Dick toxin, which causes the rash in scarlet fever, is known to be responsible for any of the clinical manifestations of streptococcal disease in man. Several, including streptolysin O, hyaluronidase, and streptokinase, stimulate the production of readily measurable antibodies in infected human beings. The estimation of these has been of great assistance in the study of streptococcal disease.

Acute Streptococcal Disease

The only important human form of hemolytic streptococcal infection from the quantitative point of view is that of the respiratory tract although pyoderma, erysipelas, cellulitis, puerperal and wound infections occur.

There is a striking change in the natural history of respiratory infection caused by these organisms with advancing age. The infant and child less than three years of age characteristically develops disease without a sharp febrile onset which often has a protracted course with greatly delayed spontaneous recovery. Rhinorrhea is the predominant early symptom and the nasal discharge contains large numbers of streptococci. The physical signs in the pharynx are nondescript and exudative tonsillitis and pharyngitis are infrequently discovered. Suppurative complications such as otitis media and cervical adenitis are exceedingly common and a skin rash (scarlet fever) is almost unknown. Rheumatic fever is also excessively rare in this age group.

As children grow older the onset of the disease tends to become acute and febrile with sore throat more, and rhinorrhea less, common. Exudative tonsillitis and pharyngitis with tender anterior cervical adenitis become the usual physical abnormalities. A skin rash is often seen. Spontaneous recovery from the acute illness without suppurative complications is the rule but the subsequent development of rheumatic fever in a substantial number of cases is to be expected by the time children have entered the second five years of life.

Prevention of Hemolytic Streptococcal Infection

The evidence summarized earlier demonstrates that rheumatic fever is a complication of hemolytic streptococcus respiratory infection. Approximately 50 percent of new Group A streptococcus infections occurring in individuals who have had rheumatic fever will be followed by recrudescences of varying degrees of intensity.

Prevention of such infections in the rheumatic subject is mandatory and may be accomplished in most instances by chemoprophylaxis. Measures designed to prevent exposure of the rheumatic patient to streptococci must fail. This is so because a large number of Group A carriers exist in the childhood population and because unrecognized cases of disease caused by these organisms are extremely common. The susceptible person will be constantly at risk unless he is isolated in a streptococcus-free environment. This may be accomplished only in a special hospital. Active immunization has also been unsuccessful for technical reasons.

These facts have stimulated great interest in chemoprophylaxis. It has been established that the continuous daily administration of a sulfonamide will prevent streptococcus infection and rheumatic recrudescences in the rheumatic subject. A summary of available experience indicates that a 93 percent reduction in recurrences of rheumatic fever may be expected in groups of rheumatic children receiving prophylaxis.

Toxic reactions have been surprisingly few, but the potential hazards of long-continued administration of sulfonamides have discouraged widespread application of this valuable technique. For this reason, penicillin prophylaxis has been explored since this agent has become cheap and plentiful. When given by mouth it is clearly effective but the optimal regimen has not been determined. Administration once or twice daily of 200,000 units or more has been utilized in most clinics, but this has made the program too costly and complicated, and patient cooperation has been unsatisfactory. Many failures have occurred during oral prophylaxis with either penicillin or sulfonamides through the neglect of patients to take the drug. It is notoriously difficult to carry out continuous ther-

apy requiring patient participation because apathy often develops. This is particularly evident in populations of the cultural and educational level in which rheumatic fever most often appears.

An important new tool which eliminates certain of these difficulties has recently been introduced. Benzathine penicillin (dibenzylethylenediamine dipenicillin G) is only slightly soluble in body fluids and is absorbed very slowly from a depot in muscle. Stollerman and Rusoff have shown that the injection of 1,200,000 units of this material at monthly intervals effectively prevents streptococcus infection and recurrences in persons who have had rheumatic fever. The availability of this material permits the establishment of a prophylactic regimen in which no responsibility lies with the patient beyond a visit to the physician or clinic each month. This should be an extremely valuable technique in many instances.

Nearly every investigator who has considered the problem of chemoprophylaxis of rheumatic fever has recommended a different regimen. Probably all would agree to the following principles: (1) Prophylaxis should be instituted immediately in all individuals in whom the diagnosis of rheumatic fever is certain. (2) Prophylaxis should be continuous on a year-round basis with no rest periods. (3) The rheumatic is at greatest risk when he is frequently exposed to children under 12, since streptococcus disease is most common in such individuals. (4) Prophylaxis should be continued for several years after the attack of rheumatic fever.

The exact definition of duration has been the point of disagreement. There is no reason, theoretically, for ever withdrawing prophylaxis. Since lifetime chemotherapy is difficult to accomplish, various limits have been set. Age 18 has been recommended by the American Heart Association. This is a reasonable compromise provided the individual is, at that time, no longer in close association with children. Schoolteachers, parents of young children, and workers in the various fields of medicine may remain at risk for much longer periods. Prophylaxis should not terminate at an arbitrary age but be tailored to the needs of specific patients.

The daily ration of sulfonamide has been standardized at 0.5 gm. for small children or 1 gm. for older children and adults. A sulfapyrimidine (sulfadiazine, sulfamerazine, sulfamethazine) should be employed.

The optimal dose of penicillin for oral prophylaxis has not been determined. Most authorities recommend 200,000 units once daily before breakfast. Buffered tablets of penicillin G are least expensive and entirely satisfactory. A single monthly intramuscular injection of 1,200,000 units of repository benzathine penicillin is appropriate when it is to be used in parenteral prophylaxis.

Treatment of Hemolytic Streptococcus Infection

Recent studies have demonstrated that adequate treatment of Group A hemolytic streptococcus respiratory infection with penicillin will prevent the development of rheumatic fever, both in healthy and in rheumatic subjects. This important observation is of inestimable value when a streptococcus infection develops in a person who had had rheumatic fever. Management of such patients without continued prophylaxis, using a regimen based on the treatment of streptococcus infection as it occurs, is not recommended. Approximately 50 percent of such infections fully capable of inciting a rheumatic recrudescence are inapparent or so atypical as to defy detection without bacteriologic study of the respiratory flora.

These developments are also of great importance in the treatment of streptococcal infection in the general population. For the first time precise diagnosis of these disorders is essential. Nearly all respiratory infections are caused by filterable viruses. Antibiotic therapy in these cases is fruitless. On the other hand, the small percentage caused by Group A hemolytic streptococci must receive not less than 10 days of continuous penicillin therapy if maximum prevention of rheumatic fever is to be attained.

Recognition of streptococcal infection on clinical grounds can be accomplished in about 75 percent of older children and adults by experienced physicians. Education and stimulation of interest of the medical profession in this problem are important steps toward more effective treatment of streptococcal infection.

Adequate facilities for bacteriological study of the nasopharyngeal flora are urgently needed if streptococcal disease is to be adequately controlled. Simple and foolproof techniques for this purpose are now available. When these are widely applied it may be anticipated that a significant further decline in the incidence of rheumatic fever will occur as physicians bring under treatment the large number of cases of streptococcal infection whose recognition is impossible on clinical grounds alone.

VNA Board Members, Directors Hold Regional Meetings

Two regional meetings for board members and directors of visiting nurse associations were held March 15th in San Pedro and March 21st at the San Mateo County Department of Public Health and Welfare under cosponsorships of the Bureau of Public Health Nursing of the SDPH and the California League for Nursing. Ninety-six board members representing 29 VNA's and two combination agencies, 28 directors and supervisors and others brought the total attendance for the two meetings to 142.

Topics discussed in San Pedro included the selection and orientation of board members. Small groups exchanged information on publicity for VNA's, combination agencies, referrals for nursing service and financing of visiting nurse services. Responsibilities of VNA's for service to the aged and extension of visiting nurse services to industrial workers were also discussed.

The San Mateo session was devoted to a panel discussion on sources of financing visiting nurse services. A representative of the Northern California Teamsters' Security Fund and a physician well informed about health and welfare plans participated in the panel discussion with board members and a director of nursing. It was brought out that if nursing services are to be included in health and welfare plans the workers must be informed of these services and want them enough to request that they be included in the plans. Awareness of private physicians of services available to their patients was also emphasized.

Deadline May 31 for Applications for Hospital Construction Funds

Hospitals and health departments which desire consideration for allocation of state and federal construction funds for the Fiscal Year 1956-57 must submit applications prior to May 31st to the California State Department of Public Health, attention Bureau of Hospitals, 2151 Berkeley Way, Berkeley 4. Agencies and organizations which have filed previously do not need to refile unless their applications are to be revised.

Consideration of applications for allocation of funds will be made July 26th-27th in Berkeley by the State Advisory Hospital Council and the department, provided the federal budget is passed not later than July 10th. The hospital survey and construction program provides state and federal funds for assistance to public and nonprofit organizations for constructing and equipping in eight categories of hospital and health facilities. These categories include general hospitals, tuberculosis hospitals, mental hospitals, chronic disease hospitals, public health centers, nursing homes, diagnostic and treatment centers (out-patient departments), and rehabilitation facilities.

If an agency is applying for funds to be used for more than one type of facility, it must submit a separate application for each type.

Each year in preparation for the allocation of state and federal funds the State Advisory Hospital Council and the department hold public hearings on proposals for revision of the California state plan for hospital construction. One hearing was held in Berkeley January 13th and the second in Los Angeles April 9th and 10th. The council has recommended to the department the policies for administration of the program. These policies establish a basis for determination of relative need and priority of applications of state and federal funds in the eight categories of hospital and health facilities.

Information regarding policies and priority sequence is available from the Bureau of Hospitals. The completed state plan for 1956-57 will be available for public inspection at meetings to be held June 27th in Los Angeles and June 28th in Berkeley.

Fluoridation at the Polls

Three California communities voted on fluoridation of public water supplies at the April 10th election, with the measure losing out in all three places. Rio Vista (Solano County), which in 1951 was the first community in California to inaugurate a fluoridation program, voted 559 to 307 to discontinue the program. Woodland (Yolo County) voted 1,463 to 804 against a proposal to fluoridate its public water supplies, and in Fairfield (Solano County) the ballot measure lost by a vote of 711 to 435.

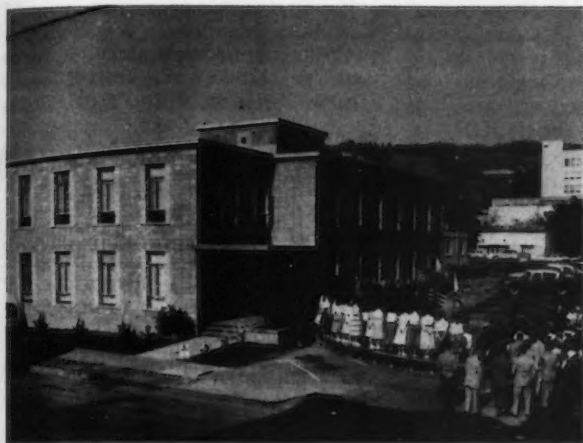
Rio Vista's fluoridation program had been in effect long enough to begin showing substantial reductions in dental decay. In a survey conducted among children of school age three years after the beginning of the program a reduction of 29 percent in decayed, filled or missing teeth was noted for the age group six to nine years. In 1951 only 26 percent of the children from six to nine had teeth which had never been affected with decay; this percentage had risen to 42 by 1954 and was expected to continue its rise. In older programs at Grand Rapids, Michigan, and Newburgh, New York, reductions of about two-thirds in dental decay among children has been recorded as the result of their fluoridation programs.

Crippled Children Services Described in New Booklet

The State Department of Public Health has just published a new booklet entitled "What Parents Should Know About California's Crippled Children's Services." As the title denotes, the booklet is designed to inform parents of community services available to them and interprets the eligibility provisions of the Crippled Children's Act. Copies have been supplied to local health departments for their distribution. Agencies which administer the crippled children's program locally are listed and space on the back cover is provided so that these agencies may imprint appropriate information relating to their services, such as phone numbers, addresses and clinic hours.

Obesity is a serious menace to the health of the American people.—Dr. Clifford F. Gastineau, Mayo Clinic.

BERKELEY DEDICATES NEW CENTER FOR UNIFIED HEALTH PLAN



Berkeley's new \$185,000 health building is the center for the city's unique unified health program linking together the City of Berkeley, the Berkeley Unified School District, the Visiting Nurse Association and the University of California School of Public Health. The new building has received recognition for its functional design and reasonable cost. It is located just a few blocks from the university campus and from the headquarters building of the State Department of Public Health. This photograph was taken during dedication ceremonies April 6, 1956.



Leading roles in the Berkeley health center dedication were played by (left to right) Berkeley Mayor Claude B. Hutchison; Dr. Frank Kelly, former Berkeley health officer who headed the department from 1923 to his retirement in 1954; Dr. Emil E. Palmquist, Berkeley director of public health; Dr. Richard F. Boyd, regional director, U. S. Public Health Service; Dr. Malcolm H. Merrill, California State Director of Public Health, and Mr. Michael Goodman, architect for the building.

Berkeley's new health center, located on McKinley Avenue adjoining the Berkeley City Hall, was dedicated April 6th in a ceremony that also gave recognition to World Health Day (April 7th). The two-story building of steel frame and concrete block construction, was built with federal, state and city funds at a cost of \$185,000. In addition, the Berkeley Health and Visiting Nurse Association contributed \$9,000 toward the project.

Participating in the dedication were the four agencies which are co-operating in a unique unified health plan—the City of Berkeley, the Berkeley Unified School District, the Berkeley Health and Visiting Nurse Association, and the University of California.

The Berkeley plan for unified health services was formally adopted last year through efforts of Mr. John D. Phillips, Berkeley City Manager; Dr. Thomas L. Nelson, Superintendent of the Berkeley Unified School District; Mrs. John C. Weaver, president of the Berkeley Health and Visiting Nurse Association, and Dr. Charles E. Smith, Dean of the U. C. School of Public Health. Under the plan the Berkeley Health Department

provides community and school health services, VNA services and functions as a field training laboratory for students of the University of California School of Public Health much as the Eastern District of the Baltimore City Health Department serves Johns Hopkins University.

Dr. Emil E. Palmquist, Berkeley Director of Public Health, was appointed last year at the time the unified plan was inaugurated. Dr. Palmquist, Dr. Alan Foord, assistant health officer in charge of the maternal and child health and school health programs, and Dr. Howard Mitchell, who will join the health department staff in July, hold academic appointments at the University of California and participate in the teaching program of the School of Public Health.

Dr. Palmquist was Director of Public Health for Seattle-King County, Washington, from 1944 to 1951. He was then commissioned by the Public Health Service and spent two years in Iran as chief of a health district under the Point Four Program. From 1953 until coming to Berkeley last year Dr. Palmquist was assistant chief of the Division of International

Health, U. S. Public Health Service, Washington, D. C.

Dr. Foord came to the Berkeley Health Department last year from Baltimore where he was director of school health services for that city and also served on the faculty of Johns Hopkins School of Public Health. Dr. Mitchell is joining the Berkeley program after being with the Indiana State Health Department as director of the maternal and child health services. He was previously with Dr. Palmquist as a regional health officer in Iran.

It is a fact that there are few important diseases which can be cured more easily, more quickly or at less cost than yaws. To illustrate the point: At the rate of wages paid to agricultural workers in Indonesia, a man who is unable to follow his employment because of yaws can be returned to work at a cost for penicillin equal to *one-half of one day's pay*.—Taken from *W. H. O. News letter*, October, 1955, an issue devoted to relating "progress made in the worldwide battle against yaws, a disease often widespread in tropical rural areas."

School Health Association to Meet in Vallejo May 12

"School Health and Our Changing Times" will be the theme of a conference to be held in the Vallejo Senior High School, May 12th by the California School Health Association. Dorothy Nyswander, Ph.D., Professor of Health Education, U. C. School of Public Health, will be the featured speaker at the morning session scheduled to begin at 9.30 a.m. Alan Foord, M.D., Director of School Services, Berkeley Public Schools, will moderate the afternoon session.

The Vallejo conference is the first in a series of regional meetings and is designed to serve persons attending from Bay area counties to Sacramento and San Joaquin Counties.

SPECIAL CENSUS RELEASES *

Special Censuses of California Cities, **Series P-28** *Los Angeles County*: Inglewood (867), Montebello (871), Pomona (868); *San Mateo County*: San Mateo (869); *Santa Barbara County*: Santa Barbara (870).

Illustrative Projections of the College-Age Population, by States: 1958 to 1973, Bureau of the Census, **Series P-25** (132); Illustrative Example of a Method of Estimating the Current Population of Subdivisions of the United States, Bureau of the Census, **Series P-25** (133); Provisional Estimates of the Population of the United States, January 1, 1950, to February 1, 1956, Bureau of the Census, **Series P-25** (134).

Copies of these releases may be obtained from: Library, Bureau of Foreign and Domestic Commerce, United States Department of Commerce at 419 Customs Building, 555 Battery Street, San Francisco, Cal., or at Room 450, 31 South Broadway, Los Angeles, Cal.

* In ordering, specify series and number as shown in parentheses. These numbers are not population figures.

American Public Health Association to Meet in Atlantic City November 12-16

The Executive Board of the American Public Health Association announces that the eighty-fourth annual meeting of the association and meetings of 40 related organizations will be held in Convention Hall, Atlantic City, New Jersey, November 12th to 16th.

The explorations into the important question, "Where Are We Going in Public Health?" which were undertaken at the eighty-third annual meeting last November, will be continued. The 13 sections of the association, namely, Dental Health, Engineering and Sanitation, Epidemiology, Food and Nutrition, Health Officers, Laboratory, Maternal and Child Health, Medical Care, Occupational Health, Public Health Education, Public Health Nursing, School Health, and Statistics, have been augmented this year by a new section on Mental Health. All will be responsible for programs in their specialties.

Plans are under way to direct the program content of at least one day to the interests of the young public health worker.

More than 4,000 professional public health workers are expected to attend the sessions.

The American Public Health Association with headquarters at 1790 Broadway, New York City, is the largest society of professional public health workers in the world, with membership over 12,000. President is Dr. Ira V. Hiscock of Yale University.

Facts regarding the morphology of cancer are discouraging to the hope of a universal cancer cure in the near future. * * * If all cancer cells were of similar structure, and greatly different morphologically from all normal cells, we could entertain such a hope. Perhaps the most important thing we have learned in 50 years of cancer research is the complexity of the problem. This means that efforts at control and cure must be increased. * * * The victory may be won not by a single decisive battle, but by a series of successful minor engagements.—T. B. Dunn, M.D., *Journal of the American Medical Women's Association*, April, 1955.

Public Health Positions

Butte County

Public Health Nurses: Salary range, \$351-413. To work in a generalized program. Optional, county car or 8 cents per mile. Write Butte County Health Department, Box 1100, Chico.

Contra Costa County

Supervising Therapist, Cerebral Palsy Program: Salary, \$429-515. Requires California license as physical therapist or certificate of registration with the National Registry of Qualified Occupational Therapists, and three years' experience in practice of physical or occupational therapy (two years involving cerebral palsy). Contact Contra Costa Civil Service Commission, Box 710, Martinez.

Humboldt-Del Norte County

Sanitarian: Salary range, \$392-415. State certificate of registration as a sanitarian required. Car furnished. For further information write to Director of Public Health, Humboldt-Del Norte County Health Department, 805 Sixth Street, Eureka.

Tulare County

Sanitarian: Salary range \$332-415. Depending on qualifications, may start at fourth step. Car furnished. Write to Elmo Alexander, M.D., Director, Tulare County Department of Public Health, P. O. Box 110, Visalia.

State of California

Public Health Nurses: Salary range, \$395-481. Car provided. Openings for assignment in rural counties under contract for services from the State Department of Public Health. Applicants must have completed an accredited university program of study in public health nursing and have had two years' experience in general public health nursing. Applicants must possess a bachelor's degree and state public health nursing certificate. For further information write to Miss Rena Haig, Chief, Bureau of Public Health Nursing, State Department of Public Health, 2151 Berkeley Way, Berkeley 4.

The health of our people is the very essence of our vitality, our strength and our progress as a Nation.—President Eisenhower, *Health Officers News Digest* XIX:6:10 (June, 1954).

Annual Mussels Quarantine Imposed for Summer Season

California's annual summer quarantine of mussels for human consumption goes into effect May 1st as protection to Californians against the highly toxic poison present in shellfish during the summer and early autumn.

The quarantine, established by the State Board of Public Health is imposed along the entire California coastal shore including San Francisco Bay. The ban is usually lifted on October 31st, but may be extended if laboratory tests show that the edible flesh of mussels still contains the toxin.

Mussels may be used for bait during the ban, but must be broken open and placed in containers plainly marked in big print, "For fish bait only. Unfit for human consumption."

Californians are also warned to be cautious in the preparation of clams for summer meals during this period. Clams should be cleaned and washed thoroughly before cooking and all dark parts, where the poison concentrates during the May-October period, should be discarded. Only the white meat of clams should be eaten. In addition, clams should be taken from areas free from sewage contamination.

The poison, found in plankton which serves as food for mussels and clams, is an alkaloid such as strychnine and can prove fatal to persons eating the toxic shellfish. California had five cases of mussel poisoning, but no deaths, in 1954. These were the first cases to be reported in California since 1948.

Health officers of the coastal and bay counties have been instructed by the State Department of Public Health to post quarantine warnings covering both mussels and clams.

There are more than 28,000,000 children of elementary school age (5-13) in the United States, and more than 18,000,000 children under five years of age. These figures represent an increase of 8,000,000 over comparable figures for 1950, according to estimates prepared by the Census Bureau. At the upper end of the scale, the number of persons age 65 and over exceeds 14,000,000, an increase of 2,000,000 over 1950.

Role of Air Pollution in Cancer To Be Studied by Department

The American Cancer Society has granted \$31,946 to the State Department of Public Health for a study of air pollution as a possible factor in lung cancer. Several pieces of evidence suggest that the air pollution of modern cities may be one of the agents responsible for the rapid increase in lung cancer. Investigations in Great Britain, and to some extent in this Country, reveal that lung cancer mortality is more frequent in metropolitan areas than it is in small cities or rural areas.

Benzpyrene, which is known to cause cancer readily in small animals, has been isolated from the air in Los Angeles and other major cities of the world. Whether this chemical substance is present in sufficient quantity to cause cancer in man has not been determined.

The specific aim of the study made possible by the Cancer Society grant will be to determine the lung cancer death rate among persons who have lived under conditions of air pollution for many years, as compared with the rate among persons who have lived under such conditions for only a few years or not at all.

In carrying out this investigation the department will be extending its present work on the causation of lung cancer. Thus far the department has confirmed cigarette smoking as an important factor in the development of the disease. Also, departmental studies have identified several occupations as possibly involved in the causation of the disease. Further work is now under way to verify or refute the role of these occupations. Now the question of air pollution will be examined in addition to that of cigarette smoking and occupational exposure.

In all of these studies, two things appear certain; the rapid increase in lung cancer in this Country and throughout the world is due to environmental exposure, and some of the environmental agents have been identified, others have not. Only when the causative factors are well understood can a comprehensive prevention program be undertaken for a disease which now causes more than 4 percent of all deaths among men and an in-

Public Health Service Increases Inactive Reserve Force

The United States Public Health Service has announced the appointment of 124 physicians, nurses, sanitary engineers, dentists, and pharmacists to the inactive reserve component of its commissioned officer corps. This includes 16 Californians.

These officers are among the most recent of the Nation's professional health specialists to be appointed under the service's program to expand its commissioned reserve by organizing and training health and medical personnel throughout the United States and its Territories for emergency duty in times of national crisis.

Officers of the commissioned reserve are held in reserve for emergency service and trained to serve in critical situations affecting the health and well-being of large numbers of people. Such emergencies might involve the devastation of cities, extensive illness and death from man-made or naturally occurring disease outbreaks, or the disruption of community life caused by hurricanes, floods, earthquakes, and other widespread natural disasters.

These officers will serve in the capacities for which their professional training and experience have fitted them. They will be called out principally to reinforce the staffs of official state and local health agencies and to augment the Public Health Service operating staff.

"Your Child From One to Six" Revised by Children's Bureau

The Children's Bureau is taking advance orders for the new edition of its publication "Your Child From One to Six," scheduled to appear in April or May. This publication was last revised in 1945. The present revision gives greater significance to the psychological development of the child. Copies may be purchased for 20 cents each, less 25 percent for orders of 100 copies or over, from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

creasing number of deaths among women.

Review of Reported Communicable Diseases Morbidity by Month of Report March, 1956

Diseases With Incidence Exceeding the Five-year Median

Diseases	Mar. 1956	Mar. 1955	Mar. 1954	Five-year Median
Amebiasis	48	48	42	39
*Coccidioidomycosis	14	8	5	5
Encephalitis, undetermined	13	8	5	6
Food poisoning	52	52	23	23
Hepatitis, infectious	175	236	276	61
Hepatitis, serum	6	10	4	2
Mumps	5,267	5,310	5,144	3,852
Poliomyelitis (total)	90	55	104	55
Poliomyelitis (paralytic)	56	21	62	21
Rabies, animal	53	25	4	8
Salmonella	118	108	80	44
Shigellosis	154	63	73	56
Tetanus	4	8	2	2
Typhoid fever	9	8	5	5

Diseases Below or Equal the Five-year Median

Diseases	Mar. 1956	Mar. 1955	Mar. 1954	Five-year Median
Brucellosis	4	7	3	7
Encephalitis, acute	40	36	30	NA
Encephalitis (mumps)	23	13	18	NA
Encephalitis (measles)	3	13	7	NA
Encephalitis (other)	1	--	--	NA
Epilepsy	286	284	262	"
Leprosy	1	5	--	"
Malaria	1	2	1	1
Measles	4,092	13,777	9,642	9,471
Meningococcal infections	35	31	48	41
Pertussis	142	678	248	248
Poliomyelitis (nonparalytic)	34	34	42	34
Psittacosis	3	3	5	"
*Q-fever	3	NR	NR	--
Rheumatic fever	15	25	40	"
Streptococcal infections	801	1,550	1,430	1,037
Trichinosis	1	--	12	"

Venereal Diseases

Diseases	Mar. 1956	Mar. 1955	Mar. 1954	Five-year Median
Syphilis	489	622	765	711
Gonococcal infections	1,129	1,453	1,627	1,291
Chancroid	6	18	6	"
Granuloma, inguinale	--	--	--	"
Lymphogranuloma, venereum	1	2	9	"

* Since July, 1, 1955, active primary (including cavitary) and disseminated coccidioidomycosis cases reportable.

NA—Not available.

NR—Not reportable prior to July 1, 1955.

" No median calculated.

NOTE: Disease not listed if no cases reported.

The annual cost of rabies is very high. In the United States alone it is estimated that cost of human treatment, based on an average per victim of \$100, is over \$4,000,000. If one also counts the loss of farm animals that are stricken, the total figure exceeds \$10,000,000.—*W. H. O. Newsletter*, Vol. 8, No. 11-12.

In the past 20 years, deaths from lung cancer in women have increased over 200 percent and in men over 600 percent.—*Science News Letter*, 67:21, 336 (May 21, 1955).

GOODWIN J. KNIGHT, Governor
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State Director of Public Health

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